TeSuCon

Technical Support & Consultancy

REPORT TECHNICAL INSPECTION
WINDPARK HONDTOCHT 06, 783876
ENERCON E70 E4 – 2300KW - 50HZ

Hondweg, Dronten, The Netherlands

E702022016, Windpark Hondtocht 06 - 783876 - TURBINE_EN - REV.01

07/06/2022

Table of Contents

Version	Date	By	Description of change
REV_01	07/06/2022	D.L.	-

1. Purpose

A visual inspection has been executed to determine the technical status of the wind turbine.

2. Scope

The following items have NOT been inspected by TeSuCon and are not covered in this report:

- Minor issues which can be easily solved by a normal service are not reported in the report.
- High voltage transformer.
- Proper inspection of the rotor blades with sky climber/rope access. The blade roots and connection to the hub have been inspected, and the blades have been inspected visually from the ground.

3. Classification turbine issues

Description in report	Clarification
OK	The item has been checked and shows no irregularities.
Info	For information purposes.
Monitor	An irregularity that should be monitored/checked closely at every service. Replacement/repair is not necessary at this moment.
Low	An irregularity, which is not a safety issue, and is relatively easy to solve.
High	An irregularity, which is not a safety issue, and is more serious and is more time and/or money consuming to solve.
Safe	Issues which concern the safety of the people working in the turbine.

4. Turbine information

General data		
Wind turbine name	Windpark Hondtocht 06	
Manufacturer	Enercon	
Wind turbine type	E70 E4 – 2300kW - 50HZ	
Wind turbine S/N	783876	
Location	Hondweg, Dronten, The Netherlands	
Hub height [m]	69	
Rotor diameter [m]	70	
Nominal power [kW]	2300	
Transformer primary [kV]	10	*according to single line diagram*
Transformer secondary [kV]	0,4	
Year of installation	2012	
Total production [kWh]	40688047	*(display)*
Total hours	79223	*(display)*
Date of visual inspection	16-05-2022	
Inspector(s)	W. Kraaij D. Lagerweij	

Blades			
Manufacturer	Enercon MN-10A		
Type	E70-4		
Set number	Unknown		
Serial Numbers	2480	2481	2482
Production Year	*Not on sign plate, probably 2012*		

Generator	
Manufacturer	Enercon
Type	G-82/23-G4
Serial number stator	12 – S70 - 1216
Serial number rotor	C/F – 189 - 224141

Tower			
Location	*Product info*	*Drawing no.*	*General layout*
Bottom	SMB-03345104	66.10.436-0 – 04	769.00-04.00-0000 St rev. b
MID-1	SMB-03345103	66.10.436-0 – 03	769.00-03.00-0000 St rev. a
MID-2	SMB-03345102	66.10.436-0 – 02	769.00-02.00-0000 St rev. a
Top	SMB-03345101	66.10.436-0 – 01	769.00-01.00.0000 St rev. b

5. Documentation in turbine

Operation Manual	*Present*
Maintenance Manual	*Not found in the turbine*
EU Declaration of Conformity	*Present*
Logbook turbine	*Present*
Electrical diagram turbine (Low Voltage)	*Not found in the turbine*
Single-line diagram (High-Voltage)	*Present*
Emergency chart	*Present*

6. Overview Safety Equipment

Item	***Last inspection***	***Next inspection due***
Service Lift	-	11-2022
Ladder	-	11-2022
Fall Arrester	-	11-2022
Internal Crane		11-2022
First Aid Kit Towerbase	*not present*	*not present*
Fire Extinguisher Towerbase	*not present*	*not present*
First Aid Kit Nacelle	-	11-2021 (expiration)
Fire Extinguisher Nacelle	12-2021	12-2023
Rescue Set Nacelle	*not present*	*not present*

Note: The data is based on the labels on the safety equipment.

7. Logbook entries

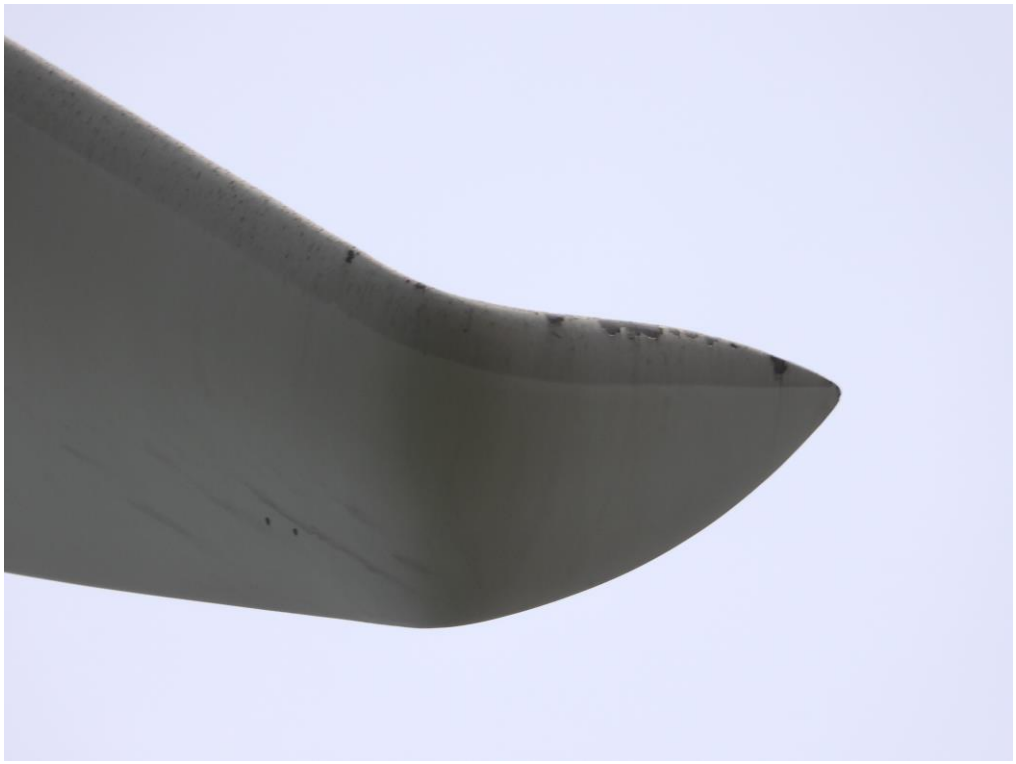
The logbook shows that maintenance at the turbine has been performed at regular intervals by Enercon. Periodical blade inspections are also mentioned.

The following table shows an overview of interesting entries in the logbook.

30-10-2012	Coil of the generator repaired
21-06-2013	Anemometer and anemometer interface replaced
22-09-2013	Load print blade B replaced
26-09-2013	Software update
20-11-2013	DC-link box 6 replaced
23-01-2014	Transformer repairs
01-04-2015	Airgap blade 2
10-05-2015	Replaced pitch control boxes blade A, B and C
08-11-2015	Pitch card C replaced
27-11-2015	Capacitor box blade C replaced
28-11-2015	Pitch box C replaced
26-04-2016	Airgap sensor 2 of C adjusted again
14-07-2016	Airgap sensor 2 of C adjusted again
05-10-2016	Airgap sensor 2 of C replaced
06-10-2020	Fan inverter replaced
14-10-2020	Longitudinal connection spoilers inspected and replaced (A, B & C)
12-08-2021	Anemometer replaced

Note: The summary is based on handwritten entries of the logbook. Several entries were short and not very legible. For a complete and accurate overview, one should consult the digital history of the service contractor

8. Turbine overview



Overview blades

Overview blades

Turbine Overview

Overview nacelle and tower outside

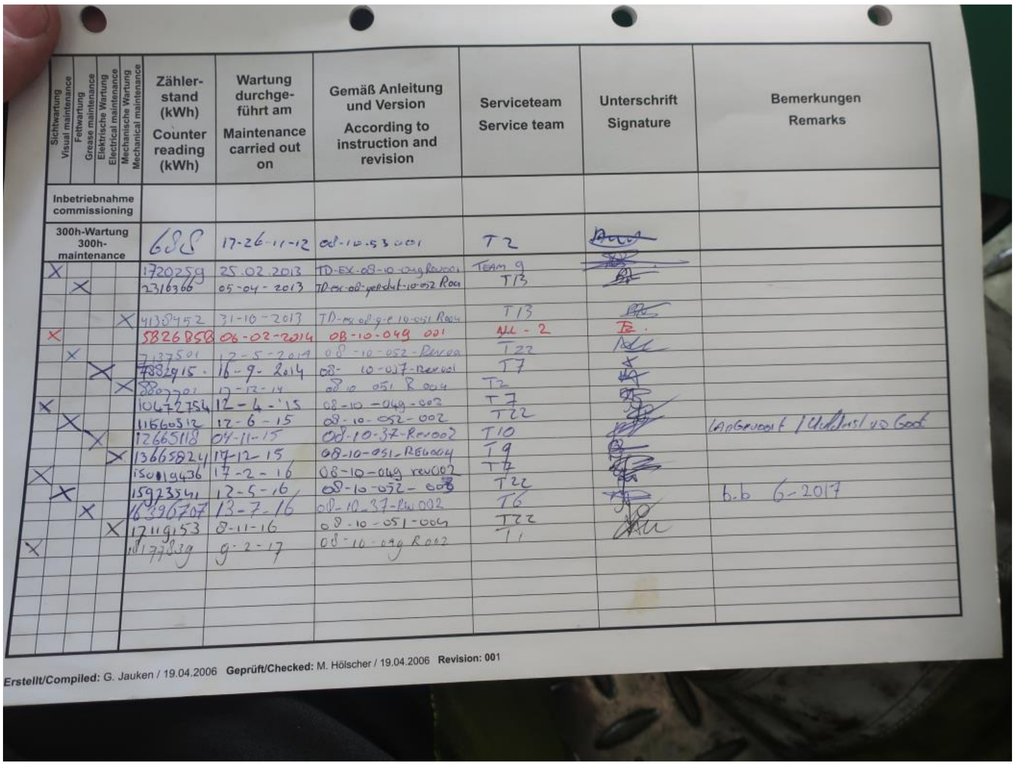
Overview towerbase

Turbine Overview

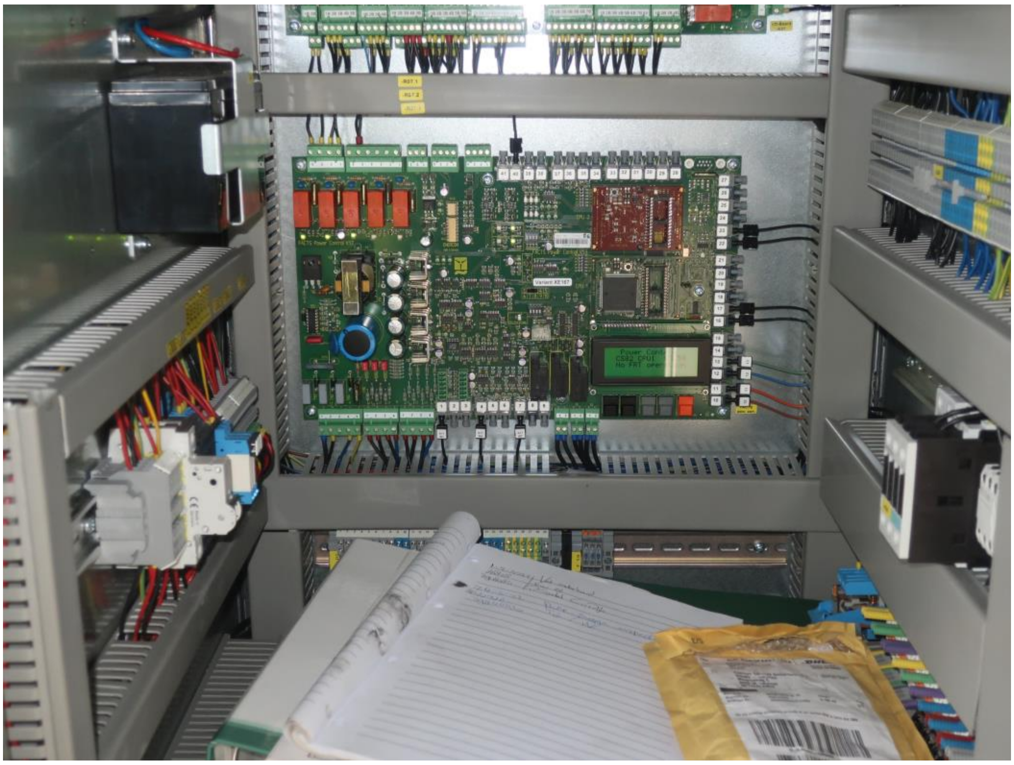
Overview foundation

Overview tower basement (area is locked)

Turbine Overview

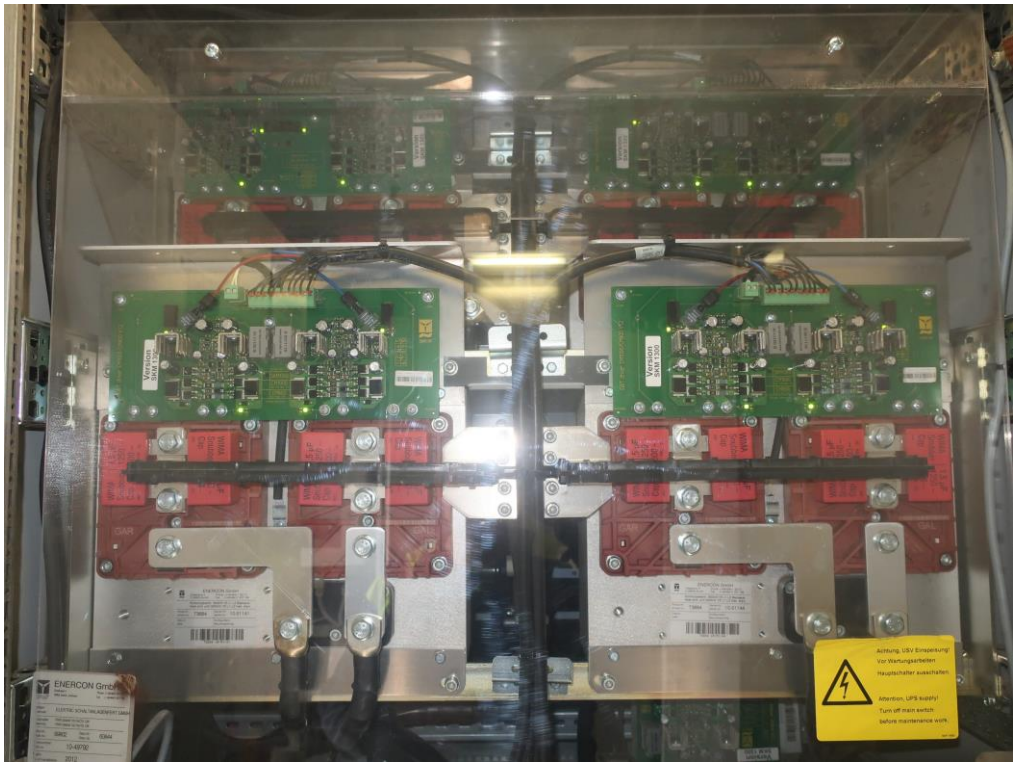


Overview maintenance history



Overview tower controller

Turbine Overview



Overview tower converter

Overview service lift

Turbine Overview

Overview inside tower

Overview yaw teeth

Turbine Overview

Overview yaw gears

Overview nacelle

Turbine Overview

Overview nacelle

Overview of the nacelle controller

Turbine Overview

Overview nacelle rectifier

Overview capacitor cabinet

Front bearing: No irregularities. No grease to check.

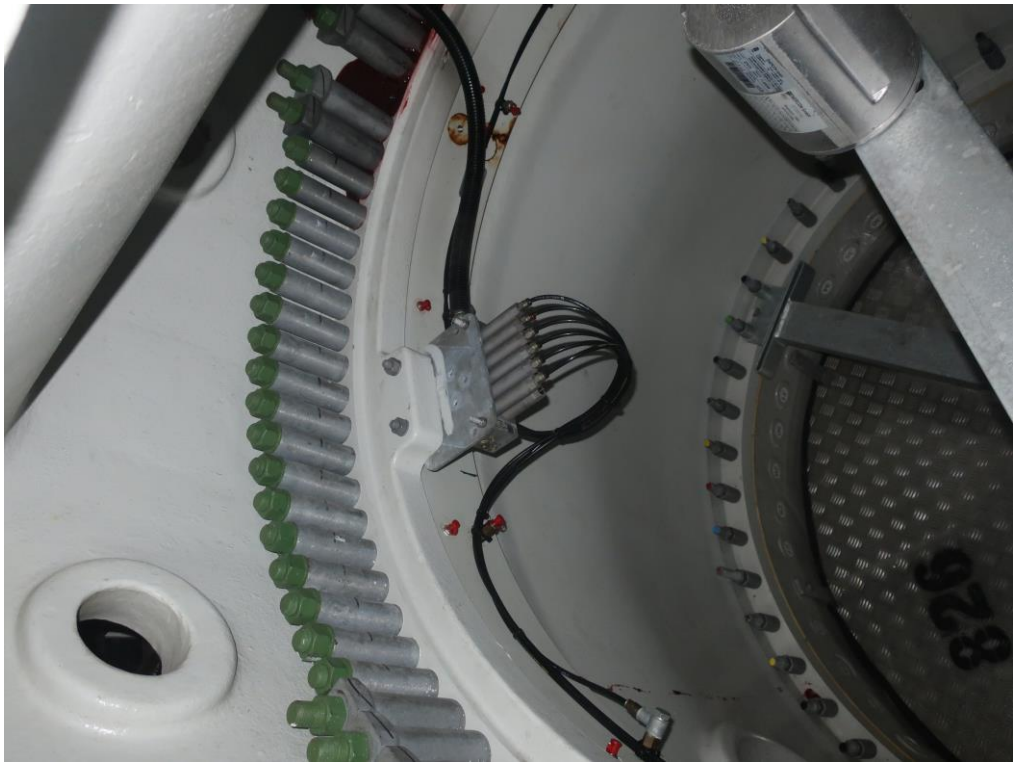
Rear bearing: No irregularities. No grease to check.

Turbine Overview

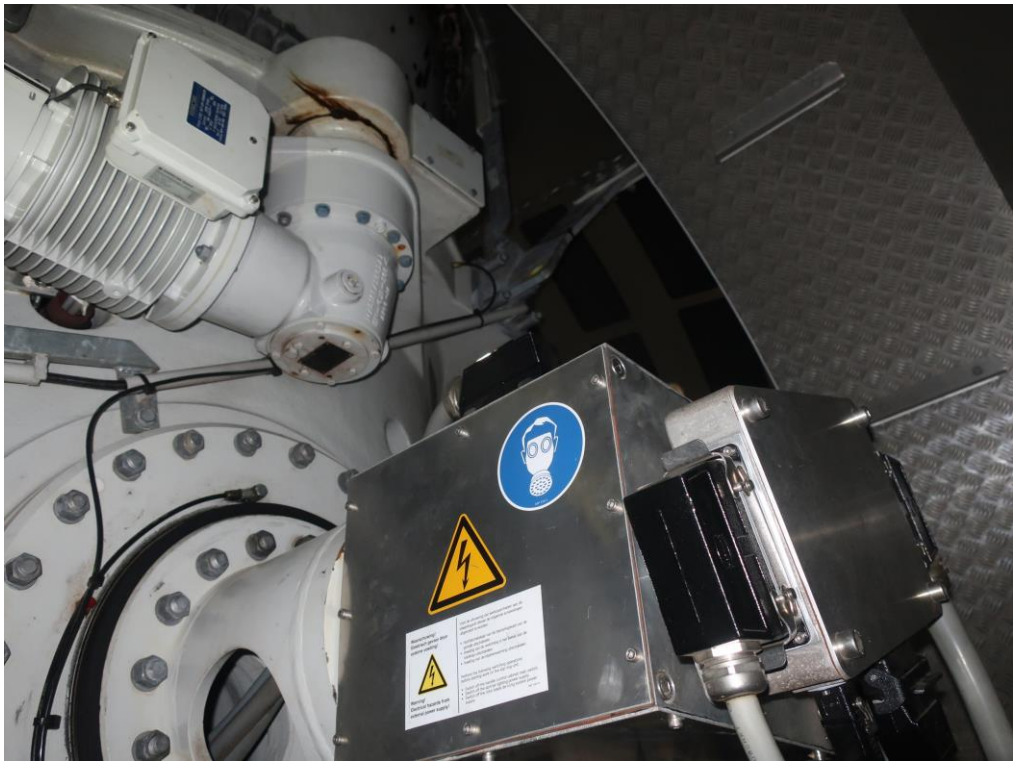
Overview generator

Overview blade bearings outside

Turbine Overview



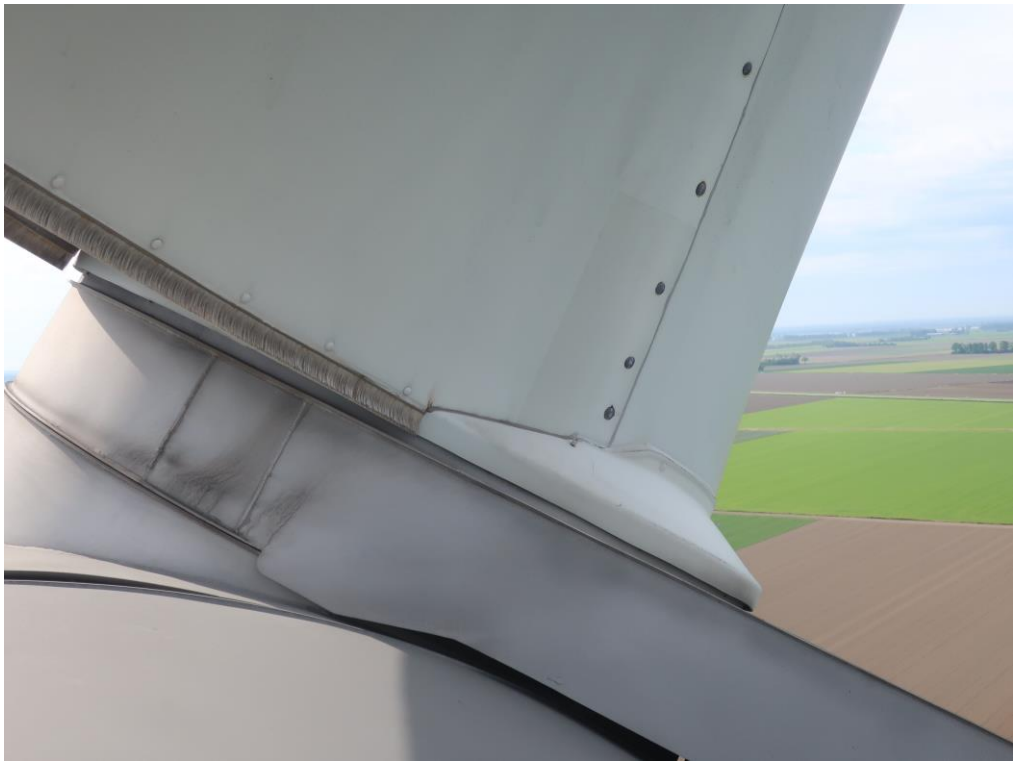
Overview blade inside



Overview pitch gear

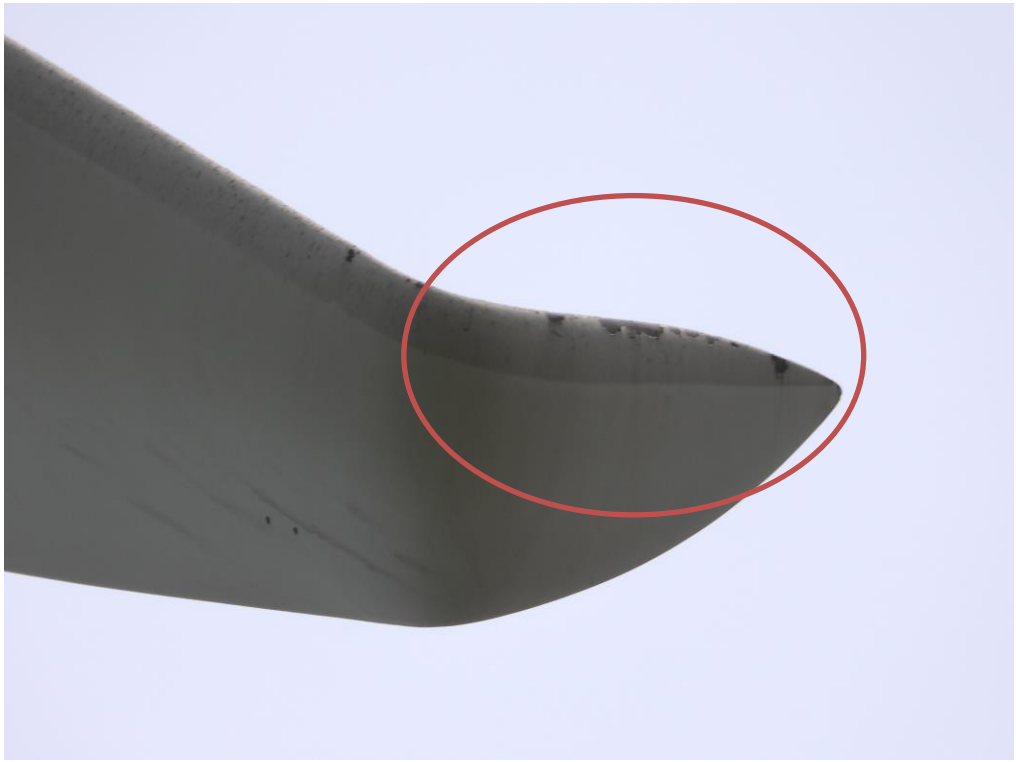
Turbine Overview

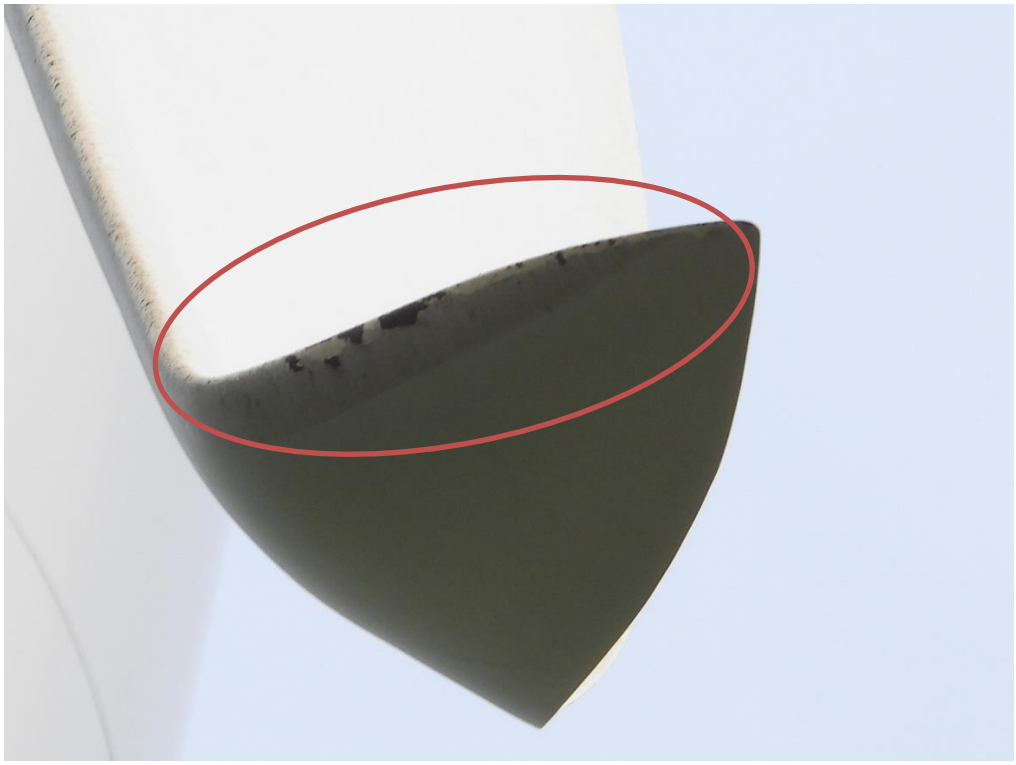
Overview wind station



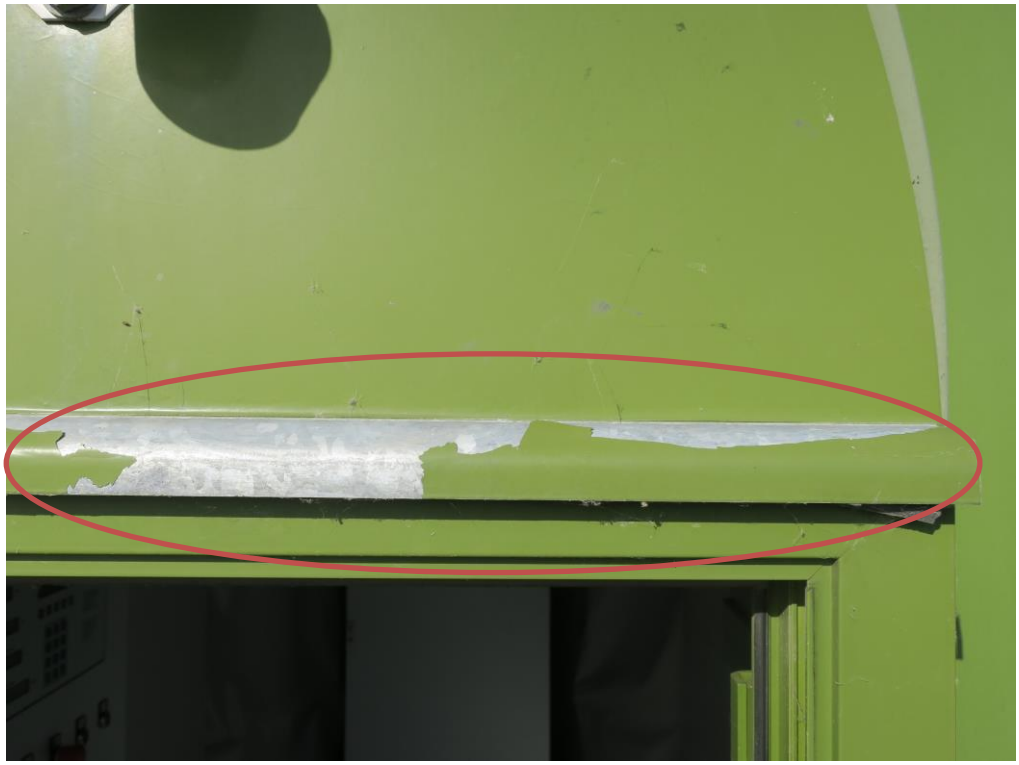
Overview hub outside

9. Turbine irregularities

Blades Outside	Blade tips
1. **High**	
Erosion of the leading edge protection is present at the tip of the blades.	

Blades Outside	Blade tips
2. **High**	
Erosion of the leading edge protection is present at the tip of the blades.	

Outside		Surface protection
3.	Low	
Minor surface protection damage.		

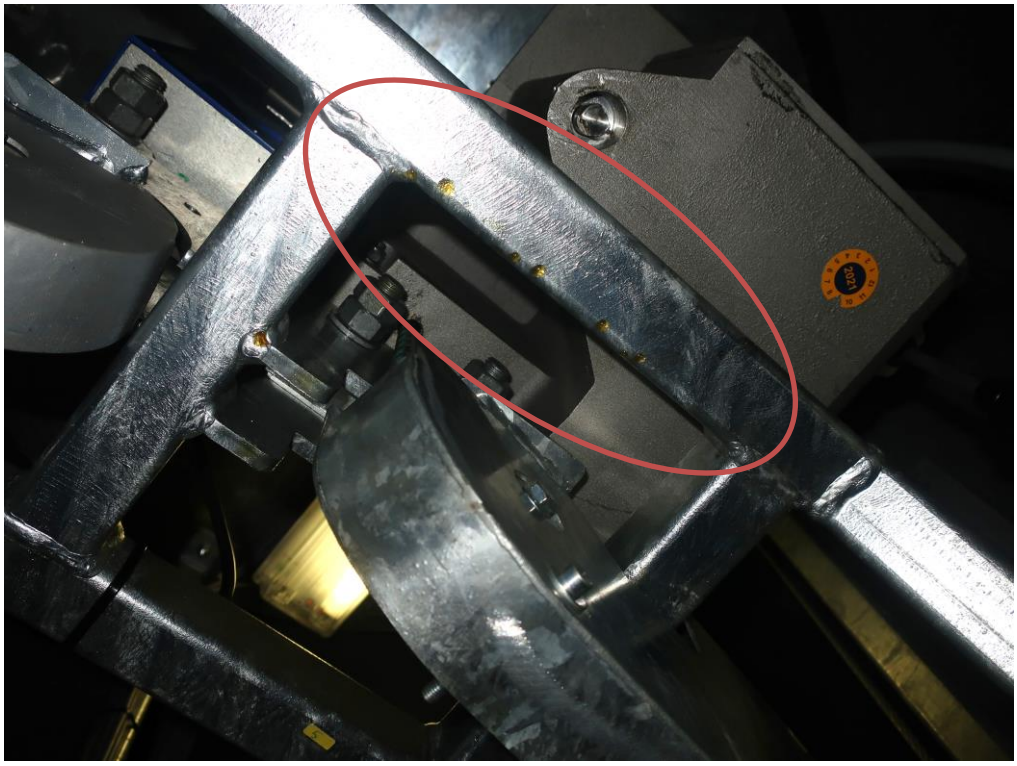
Outside		Surface protection
4.	Low	
Minor surface protection damage.		

Outside	Surface protection
5. **Low**	
Minor surface protection damage.	

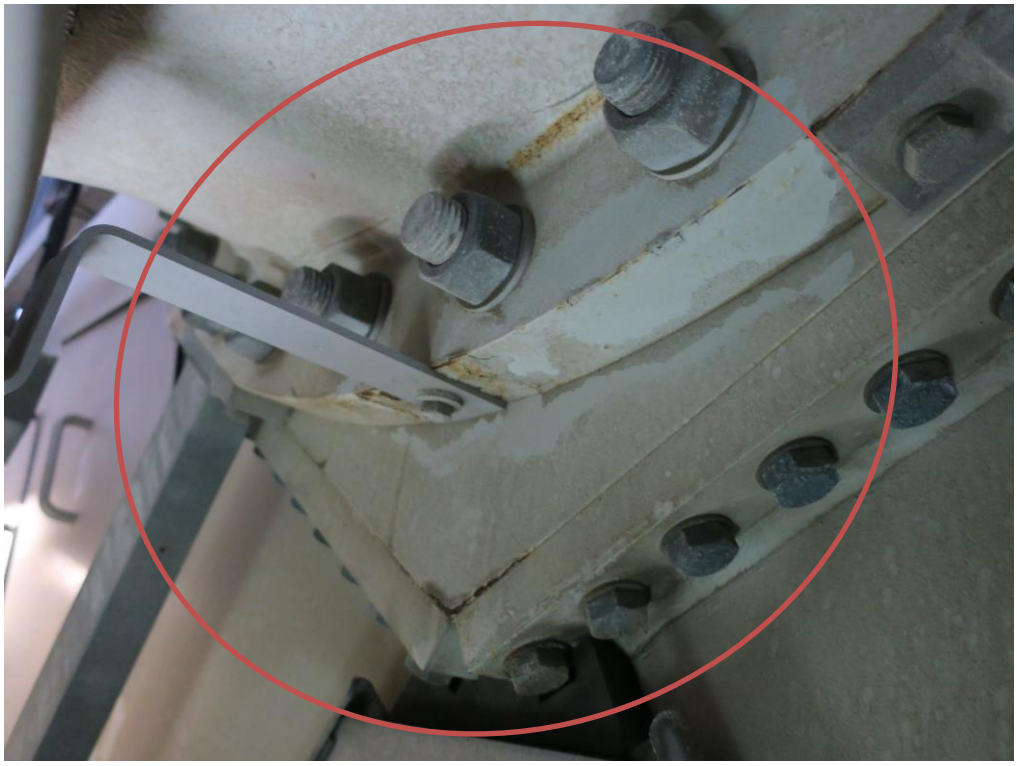
Inside	Door alignment
6. **Low**	
The door is not properly aligned. As a result, the door is not completely secured against the intrusion of water from outside. The door is also a bit difficult to open because it gets stuck at the bottom.	

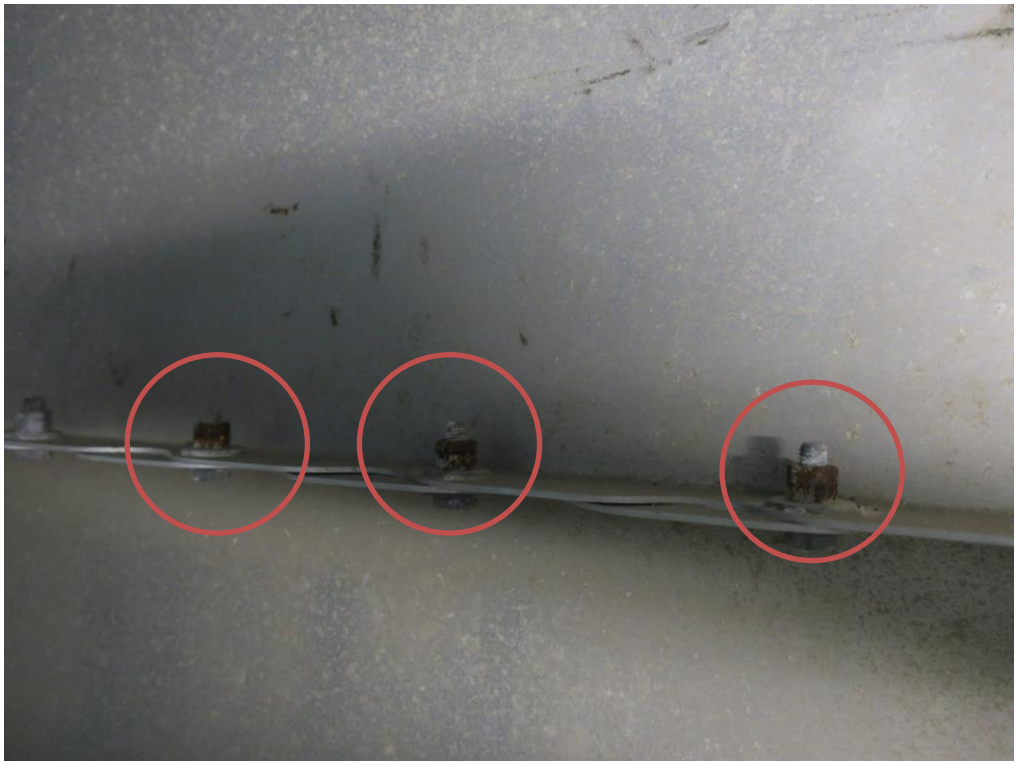
Inside	Emergency charts (1/2)
7. Low The emergency charts are not properly attached to the surface.	

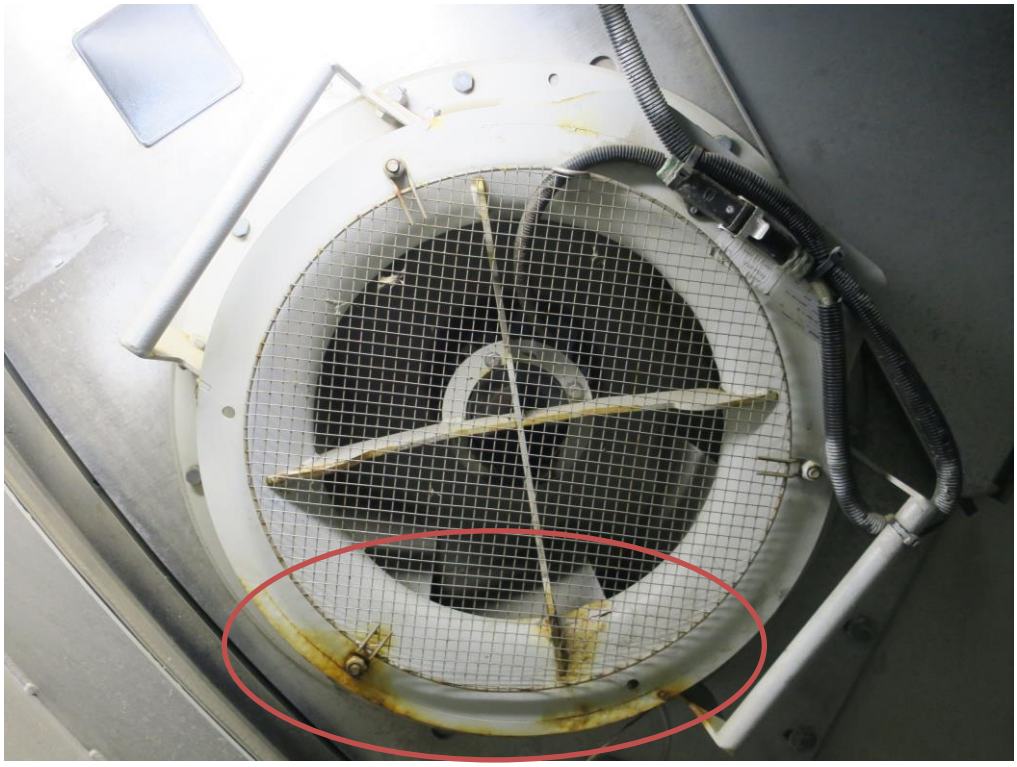
Inside	Emergency charts (2/2)
8. Low The emergency charts are not properly attached to the surface.	

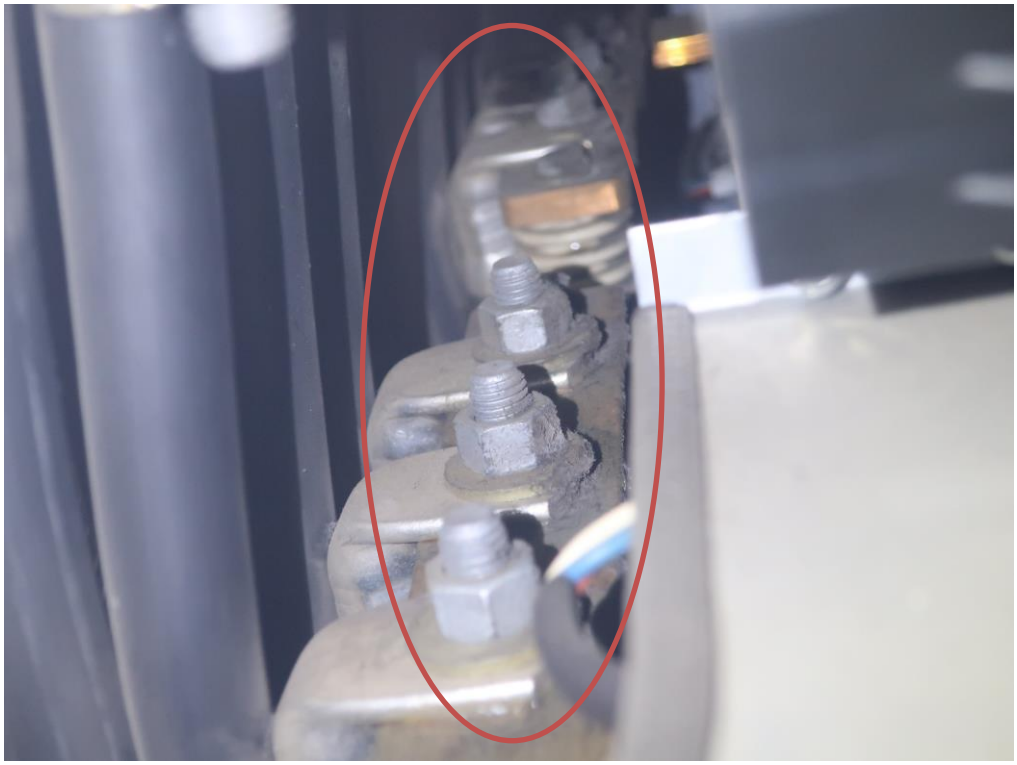
Inside	Service lift: Drops of oil
9. **Safe**	
Several oil drops are present underneath the hoist of the service lift.	

Tower inside	Air duct 1st flange
10. **Low**	
The flexible air duct is not properly installed onto the platform.	

Nacelle	Main shaft housing
11. **Low**	
Minor corrosion at the bottom of the main shaft housing.	

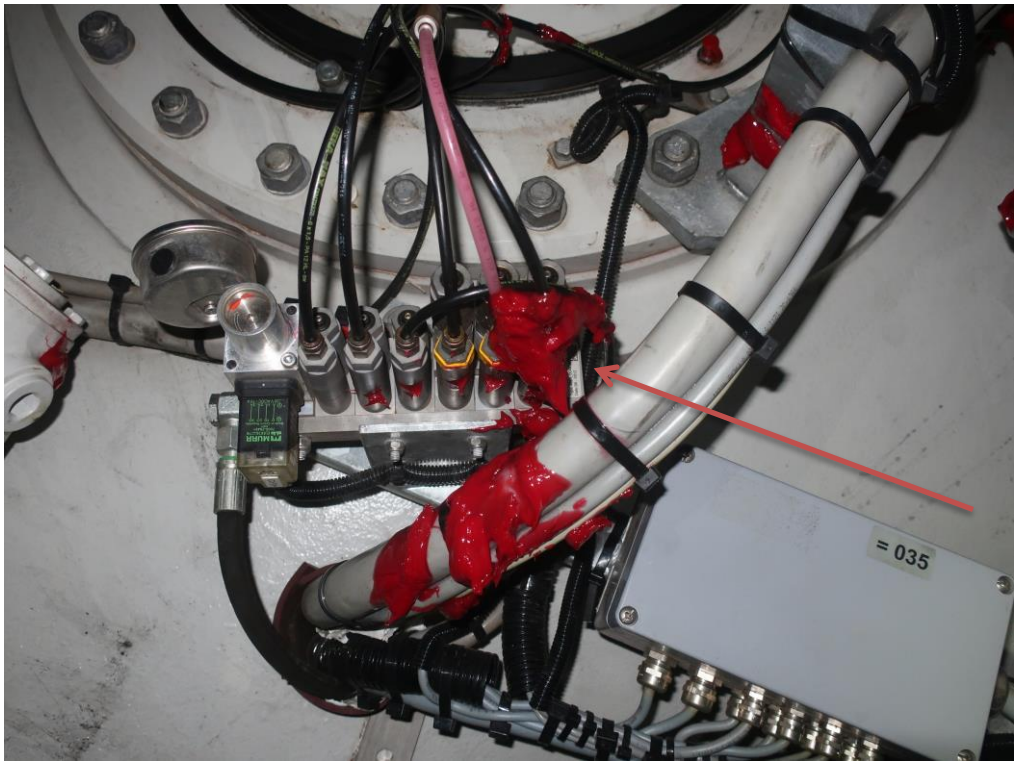
Nacelle	Nacelle bottom corrosion
12. **Low**	
Almost all the bolt connections of the nacelle covers show corrosion.	

Nacelle	Generator cooling fans
13. **Low**	
Minor corrosion is present at the cooling fans in the basement of the nacelle.	

Nacelle	Box 017: Minor pollution dust
14. **Low**	
Bus bars and connections are covered in dust. It is recommended to clean the affected areas at the next electrical maintenance.	

Nacelle	*Bracket to secure the roof hatch lock*
15. ***Low***	
The bracket to secure the roof hatch lock is not installed and is present on the nacelle floor.	

Rotor	*Pollution with grease*
16. ***Low***	
Minor pollution from the grease from the blade bearings.	

Rotor	Grease distribution block
17. Low	
Leakage is present at the grease distribution block at the front of the rotor.	

Rotor	Blade platform 2482
18. Safe	
The bolt connection of the blade platform is missing. It is highly recommended to repair the bolt connection.	

10. Conclusions & Recommendations

The general condition of the turbine is good. The logbook shows that periodical maintenance has been performed according to the schedule by Enercon.

The few issues that were found are relatively small and easy to repair, e.g. paintwork, corrosion, cleaning and minor leakage. These issues should be addressed, but they will not lead to alarms, dangerous situations or additional problems immediately.

Some issues, however, are more serious and/or require immediate attention or additional explanation:

Issue	Description
1 2	*Erosion of the leading edge protection is present at the tip of the blades.* The erosion is not extreme, but it is recommended to repair the protective top layer before the underlying composite will get exposed to the elements.
9	*Several oil drops are present underneath the hoist of the service lift.* The drops appear to be caused by the hoisting cable which has been oiled/greased quite abundantly. It is recommended to clean the affected areas and to verify that the oil is NOT caused by leakage of the gearbox of the hoist. If leakage of the gearbox of the hoist is present it is likely that the hoist has to be sent to Goracon for revision/repairs.

Dennis Lagerweij,

Barneveld, 7-6-2022

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